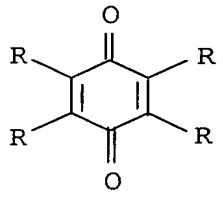
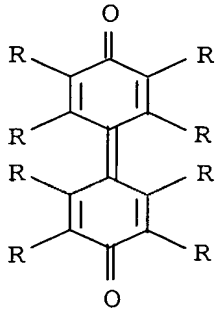
We claim:

1. A process for emulsion polymerization of one or more olefins by reacting a ligand of the formula Ia or Ib or a mixture of at least two of the ligands Ia or Ib



Ia



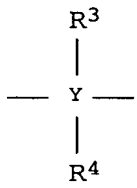
Ib

in each of which R denotes one or more of the following radicals:

hydrogen
halogen
nitrile
C_1-C_{12} alkyl, C_1-C_{12} alkoxy, C_7-C_{13} aralkyl, C_6-C_{14} aryl groups, unsubstituted or substituted by: C_1-C_{12} alkyl groups, halogens, C_1-C_{12} alkoxy, C_3-C_{12} cycloalkyl, C_1-C_{12} thioether groups, carboxyl groups or sulfo groups present where appropriate in the form of their salts, and also amino groups with hydrogen and/or C_1-C_{12} alkyl radicals

amino groups NR^1R^2, where R^1 and R^2 together or separately are hydrogen, C_1-C_{12} alkyl, C_7-C_{13} aralkyl or C_6-C_{14} aryl groups and may additionally form a saturated or unsaturated 5- to 10-membered ring, unsubstituted or substituted by: C_1-C_{12} alkyl groups, halogens, C_1-C_{12} alkoxy, C_3-C_{12} cycloalkyl, C_1-C_{12} thioether groups, carboxyl groups or sulfo groups present where appropriate in the form of their salts, and also amino groups with hydrogen and/or C_1-C_{12} alkyl radicals

and where identical or different compounds of the formulae Ia and Ib may where appropriate also be bridged by one or more C_1-C_{12} alkylene, C_2-C_{12} alkylated azo or formula II bridges



II

where Y is silicon or germanium and R^3 and R^4 are hydrogen and/or C_1-C_{12} alkyl,

with a phosphine compound PR'_3, where R' is hydrogen, C_1-C_{12} alkyl, C_4-C_{12} cycloalkyl, C_7-C_{15} aralkyl or C_6-C_{15} aryl groups,

or with a diphosphine compound R'_2P-G-PR'_2, where R' is as defined for the phosphine compounds PR'_3 and G is C_1-C_{12} alkyl, C_4-C_{12} cycloalkyl, C_7-C_{15} aralkyl or C_6-C_{15} aryl groups,

and also with a metal compound of the formula $M(L^2)_2$ or $M(L^2)_2(L^1)_z$,

where the variables are defined as follows:

M is a transition metal from groups 7 to 10 of the Periodic System of the Elements;

L^1 is phosphanes $(R^5)_xPH_{3-x}$ or amines $(R^5)_xNH_{3-x}$ with identical or different radicals R^5, ethers $(R^5)_2O$, H_2O, alcohols $(R^5)OH$, pyridine, pyridine derivatives of the formula $C_5H_{5-x}(R^5)_xN$, CO, C_1-C_{12} alkyl nitriles, C_6-C_{14} aryl nitriles or ethylenically unsaturated double bond systems, x being an integer from 0 to 3,

R^5 is hydrogen, C_1-C_{20} alkyl groups, which may in turn be substituted by $O(C_1$-C_6 alkyl) or $N(C_1$-C_6 alkyl)$_2$ groups, C_3-C_{12} cycloalkyl groups, C_7-C_{13} aralkyl radicals, and C_6-C_{14} aryl groups,

L^2 is halide ions, $R^6{}_xNH_{3-x}$, where x is an integer from 0 to 3 and R^6 is C_1-C_{12} alkyl, and also C_1-C_6 alkyl anions, allyl anions, benzyl anions or aryl anions, it being possible for L^1 and L^2 to be linked to one another by one or more covalent bonds,

z is a number from 0 to 4,

which comprises using the reaction product immediately to polymerize or copolymerize olefins in water or a solvent mixture with a water content of at least 50% by volume in the presence of an emulsifier and, optionally, of an activator.

2. A process as claimed in claim 1, wherein one or more olefins are emulsion polymerized as a miniemulsion in water, produced with the aid of ultrasound.

3. A process as claimed in claim 1 or 2, wherein an activator is used.

4. A process as claimed in any of claims 1 to 3, wherein said activator comprises olefin complexes of rhodium or of nickel.

5. A process as claimed in any of claims 1 to 4, wherein said emulsifier is based on an ionic emulsifier.

6. A process as claimed in any of claims 1 to 5, wherein one of said olefins is ethylene.

7. A process as claimed in any of claims 1 to 6, wherein one olefin is ethylene and the comonomer is selected from propylene, 1-butene, 1-hexene, and styrene.

8. A process as claimed in any of claims 1 to 7, wherein the olefin for polymerization is ethylene.

9. An aqueous dispersion of a polyolefin or copolymer of two or more olefins, obtainable as set forth in any of claims 1 to 8.

10. An aqueous dispersion of a polyethylene or ethylene copolymer, obtainable as set forth in any of claims 1 to 8.

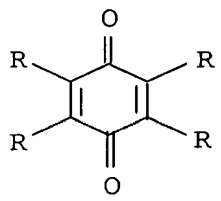
11. An aqueous dispersion as claimed in claim 9 in the form of a miniemulsion.

12. The use of an aqueous dispersion of polyethylene as claimed in claim 10 for paper applications such as paper coating or surface sizing, paints, adhesive base materials, foam moldings such as mattresses, applications to textiles and leather, coatings on carpet backings, or pharmaceutical applications.

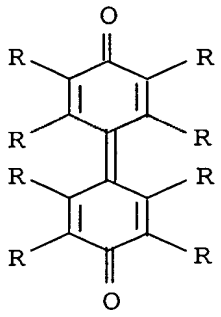
Emulsion polymerization of olefins

Abstract

A process for emulsion polymerization of one or more olefins by reacting a ligand of the formula Ia or Ib or a mixture of at least two of the ligands Ia or Ib



Ia



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C_1-C_{12} alkyl, C_1-C_{12} alkoxy, C_7-C_{13} aralkyl, C_6-C_{14} aryl groups,

and where identical or different compounds of the formulae Ia and Ib may also be linked, where appropriate, by one or more bridges, with a phosphine compound PR_3' and with a metal compound of the formula $M(L^2)_2$ or $M(L^2)_2(L^1)_z$,

where the variables are defined as follows:

M is a transition metal from groups 7 to 10 of the Periodic System of the Elements;

L^1 is phosphanes $(R^5)_xPH_{3-x}$ or amines $(R^5)_xNH_{3-x}$ with identical or different radicals R^5, ethers $(R^5)_2O$, H_2O, alcohols $(R^5)OH$, pyridine, pyridine derivatives of the formula $C_5H_{5-x}(R^5)_xN$, CO, C_1-C_{12} alkyl nitriles, C_6-C_{14} aryl nitriles or ethylenically unsaturated double bond systems, x being an integer from 0 to 3,

L^2 is halide ions, $R^6_xNH_{3-x}$, where x is an integer from 0 to 3 and R^6 is C_1-C_{12} alkyl, and also C_1-C_6 alkyl anions, allyl anions, benzyl anions or aryl anions, it being possible for L^1 and L^2 to be linked to one another by one or more covalent bonds,

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and using the reaction product immediately to polymerize or copolymerize olefins in water or a solvent mixture with a water content of at least 50% by volume in the presence of an emulsifier and, optionally, of an activator.